## Appendix C

#### POTENTIAL RIPRAP TEST REPORT

**Report Number:** AJ141004.001

**Service Date:** 3/26/2014 **Report Date:** 3/26/2014

Client



1392 13th Ave. SW Great Falls, MT 59404 406-453-5400

Project

Morrison Maierle Inc. Attn: Nick Kraus 2880 Technology Boulevarde

Bozeman, MT 59715

Deadman's Basin Diversion

Project Number: AJ141004

#### TEST DESCRIPTION

In late February 2014, we received 3 samples of rock proposed for use as riprap on the Deadman's Basin Diversion project. We crushed the material by hand to -2 1/2" and performed Specific Gravity and Absorption testing in accordance with ASTM C127, and Los Angeles Abrasion testing in accordance with ASTM C535. The test results are presented below.

	Harlowton Pit	Casino Creek Pit	Stenberg Pit	
Bulk Specific Gravity Bulk Specific Gravity (SSD) Apparent Specific Gravity	2.49 2.55 2.64	2.48 2.51 2.56	2.30 2.41 2.60	
Absorption,	2.2	1.2	5.1	
Los Angeles Abrasion, % Loss	16.1	16.7	48.5	

Terracon Rep.: Chapman, R

Reported To: Contractor:

**Report Distribution:** 

(1) Patrick Construction, David Armstrong

Reviewed By:

Shoquist, Keith R. Laboratory Manager, SET

lat ush 5

The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

#### **TESTED RIPRAP EXAMPLE PHOTOS**



Harlowton Pit (Harlowton)



Casino Creek Pit (Lewistown)



Stenberg Pit (Big Timber)

# GP-6 GASOLINE POWERED PORTABLE ACTUATOR

WATERMAN GP-6 "UNIVERSAL" GASOLINE POWERED PORTABLE VALVE ACTUATOR

Introducing the Waterman "Universal" Portable Valve Actuator driven by a powerful gasoline engine. The Universal actuator is designed to rotate input shafts on a variety of valve types including butterfly, gate, plug, ball, sluice and slide, regardless of brand. By simply rotating the unit 180°, a clockwise or counterclockwise output can be generated, allowing either opening or closing functions.

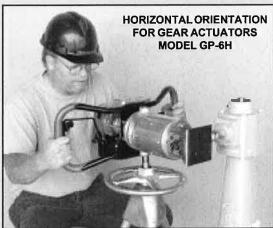
The Universal GP-6 actuator can include a "64 spline to ¾" square coupler for interchanging between the two output shafts. Adapters can be included for use with almost any input, including 2" square, half round, or a variety of square shaft sizes.

The GP-6 actuator is ava aluminum tripod cart for ea may also be used with an or rest or be hand held.



VERTICAL ORIENTATION
FOR STREET VALVES
MODEL GP-6V





#### TYPICAL SPECIFICATIONS FOR GP-6 GASOLINE POWERED PORTABLE ACTUATOR

A portable, two-cycle, gasoline engine actuator shall be furnished with all the necessary adaptors to drive the gates and valves specified.

Maximum output torque shall be less than 80 foot pounds. Drive unit shall incorporate a direct drive design only. (Belt and chain drive mechanisms are unacceptable.)

The unit shall drive the operators using a (T-drive) gear box. Reverse operation is achieved by rotating the drive unit 180 °.

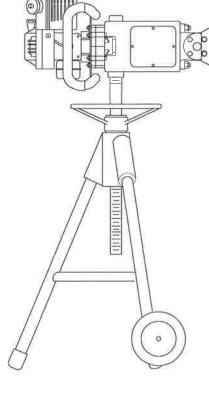
A safety clutch must be supplied with any unit that exceeds 80 foot pounds of output torque.

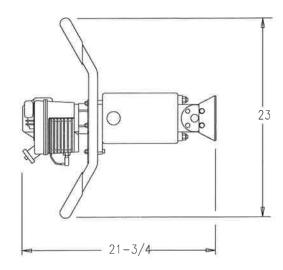
The entire unit shall weigh less than 40 pounds.

This product shall be as manufactured by Waterman Industries, Inc., Exeter, Ca. or an approved equal.



#### **MODEL GP-6H (HORIZONTAL)**



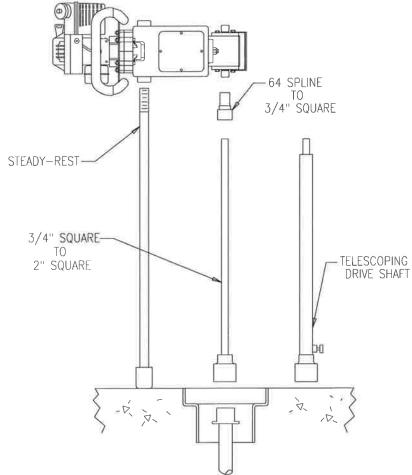


#### TECHNICAL DATA:

POWERHEAD
49cc/2 cycle
1hp/15.7 in. lbs.
2.0 hp
4,000 - 6,000 rpm
Centrifugal clutch
45.1:1 Transmission
89 - 134 Output rpm
709 - 1218 in. lbs. Output Torque
60 - 102 ft. lbs. Output Torque
.875" dia. keyed shaft

COUPLER .875" dia.

GEAR BOX 1:1 Gear ratio 6.5 lbs. TOTAL WEIGHT = 39 lbs.



**MODEL GP-6V (VERTICAL)** 



# EM-25 PORTABLE ELECTRIC OPERATOR

- · Heavy Duty Drill Motor
- Sturdy Tripod Stand Optional
- Optional Wheeled Tripod
- Auto Reset Type Overload Release Clutch
- Light Weight Unit for Maximum Portability
- Adaptable to almost any make Geared Lift

The Waterman EM-25 portable electric actuator is suitable for use with almost any type valve or gate utilizing a multiple turn geared input. Adapters are available for any type input shaft (square, half-round, splined, etc.) and the optional tripod support stand is height adjustable from 32" to 44" to accommodate most operator input heights. The motor is rated for 15 minutes continuous duty under full load, allowing full open-close cycle for most equipment. The EM-25 features a single phase motor, 110 volt, 60 cycle current and is reversible for easy open-close actuation. A 7.5 foot grounding type cord is furnished with the unit along with a torque handle for ease of operation.



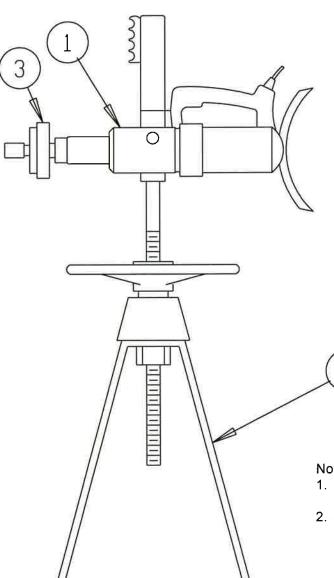
#### TYPICAL SPECIFICATIONS FOR PORTABLE ELECTRIC OPERATOR

The Portable Electric Operator shall be a tripod-mounted, electric drill-type operator with a single phase motor designed for 110 volt, 60 Hz current and reversible operation. An automatically resetting clutch shall be provided to limit output torque to 75 ft/lb. An adapter shall be provided to allow use with geared gate operators with horizontal input shafts. The aluminum tripod shall be adjustable in height from 32" to 44". A 7.5 foot long grounded type cord shall be included. The operator shall be provided by the gate manufacturer and shall be Waterman Model EM-25 or approved equal.



#### **EM-25 PORTABLE ELECTRIC OPERATOR**

No.	Part
1	Electric Operator
2	Aluminum Tripod
3	Overload Release Clutch



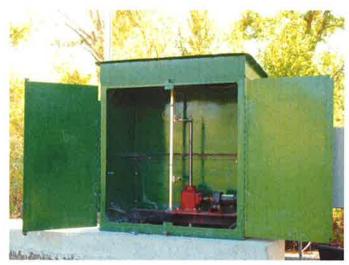
7.5 Ft. 3 Cond., 16 Ga. Cable w/grounding type 3 prong plug. Extension cord by others.

#### Notes:

- 1. Clutch rating 25 85 ft. lbs. Shop set at 75 ft.lbs.
- 2404-1 Specifications:
   Max. torque 4
   Speed 250 Max. RPM
   Operation Reversible
   Power 115 Volts AC 60Hz
   Overall Length 18.75"
   Current Draw 10 Amps @ full load
   Power Required 1200 watt @ full load
- 3. Weight 70 lbs.



# EXAMPLE PHOTOS FROM TYPICAL 12-VOLT DC MOTOR AUTOMATION INSTALLATION



Typical Installation with Fabricated Enclosure



12-Volt DC Motor and Geared Operator



Power Supply and Controls for Fully-Automated System



 3011 Palmer Street
 Ph: (406) 542-8880

 Missoula, Montana 59808
 Fax: (406)-542-4801

### ENGINEER'S OPINION OF CONCEPTUAL COST\*

Date: 5/28/2014

Project #: 1447.035

Project Name: Deadman's Basin Diversion and Headgate

Engineer: J. Smith

		Estimated			
Item No.	Description	Quantity	Unit	Unit Price	Total Cost
101	101 Mobilization and Demobilization		LS	\$50,000	\$50,000
102	102 Diversion and Care of Stream/Dewatering		LS	\$25,000	\$25,000
103	103 Concrete & Radial Gate Demolition		LS	\$20,000	\$20,000
104	Excavation & Placement of Fill	1	LS	\$7,000	\$7,000
105	105 Cast-In-Place Concrete (Diversion)		CY	\$800	\$68,000
106	106 Cast-In-Place Concrete (Sediment Sluiceway, & Intake Sill)		CY	\$800	\$48,000
107	107 Cast-In-Place Concrete (Headgates)		CY	\$800	\$72,000
	Riprap (Owner Procured)	1,665	CY	\$100	\$166,460
108	108 Grouted Riprap Placement (Rock Ramp)		CY	\$60	\$64,200
109	Non-Grouted Riprap Placement (Rock Ramp)	526	CY	\$20	\$10,520
110	Non-Grouted Riprap Placement (Headgate Outlet)	70	CY	\$20	\$1,400
	4'x4' Sluice Gate (Owner Procured)	1	LS	\$10,000	\$10,000
	6'x6' Sluice Gate (Owner Procured)		LS	\$16,000	\$64,000
	Sluice Gate Electric Motor	2	LS	\$10,000	\$20,000
111	4'x4' Sluice Gate Installation	1	LS	\$2,500	\$2,500
112	2 6'x6' Sluice Gate & Controls Installation	4	LS	\$2,500	\$10,000
113	113 Misc. Appurtenances (Walkways, Railings)		LS	\$10,000	\$10,000
114	114 Erosion Control		LS	\$5,000	\$5,000
115	5 Site Restoration	1	LS	\$5,000	\$5,000
	CONSTRUCTION SUB-TOTAL				\$659,080
	CONTINGENCY		15%		\$98,862.00
	CONSTRUCTION TOTAL		.070		\$757,942
Owner P	rocured Items:				\$260,460
Fish Pas	sage Items:				\$64,000
	Riprap (Only for Fishway)	400	CY	\$100	\$40,000
	Grouted Riprap Placement (Fishway Chute)	400	CY	\$60	\$24,000